C4 heat treatment at a temperature between 2,000°C and 2,100°C for 5 to 20 minutes at least once.

C5 18. (Amended) The method for producing a silicon carbide sintered body according to claim 12, wherein the carbon content of the organic substance impregnated in the molded body during the calcination is 10 to 30 wt%.

REMARKS

Claims 12-19 are pending. The Office Action objects to the specification and rejects claims 12-19. This Amendment amends the specification and amends claim 12, 14 and 18. No new matter is added. In view of the foregoing amendments and the following remarks, reconsideration and allowance are respectfully requested.

The attached Appendix includes marked-up copies of each rewritten paragraph (37 C.F.R. §1.121(b)(1)(iii)) and claim (37 C.F.R. §1.121(c)(1)(ii)).

I. Rejection under 35 U.S.C. §112, second paragraph

The Office Action rejects claims 12-19 under 35 U.S.C. §112, second paragraph. Applicants respectfully traverse the rejection.

The Office Action rejects claim 12, asserting that the phrase "carbon contained in the molded body" has no antecedent basis and that the source of carbon is unclear. Amended claim 12 defines the steps involved in the claimed method. Support for the amendment is contained in the specification at least at page 15, lines 8-10, and in Example 1, specifically at page 21, lines 16-22. As such, claim 12 provides the antecedent basis and a clear source for carbon.

The Office Action rejects claim 14, stating that the post-treatment step of the recited method is unclear. Amended claim 14 recites the heating schedule of the claimed method. Claim 14 satisfies the requirements of 35 U.S.C. §112, second paragraph.

The Office Action rejects claim 18, asserting that the organic substance impregnated in the molded body is indefinite. Claim 18 depends from claim 12. The amendment to claim

12 recites an additional step of "impregnating the molded body with an organic substance comprising at least one kind of carbon source," that supports the organic substance impregnated in the molded body feature in claim 18. Accordingly, this portion of claim 18 satisfies the requirements of 35 U.S.C. §112, second paragraph.

The Office action further rejects claim 18, stating that the basis of "10 to 30%" is undefined. Amended claim 18 recites that the carbon content is 10 to 30 wt%. Support for this amendment can be found in the specification at Example 1.

Claims 12-19 satisfy the requirements of 35 U.S.C. §112, second paragraph. Accordingly, Applicants request reconsideration and withdrawal of the rejection.

II. Objection to Specification

The Office Action objects to the specification due to informalities. Specifically, at page 7, the specification inaccurately states that silicon oxide is an example of a solid carbon source. Applicants amend this portion of the specification to clarify that silicon oxide is a source of solid silicon.

The Office Action further points out that at page 17, line 3, "molted" should be "molten." Applicants amend this portion of the specification as requested.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the objection.

III. Rejection under 35 U.S.C. §112, first paragraph

The Office Action rejects claims 12-19 under 35 U.S.C. §112, first paragraph, alleging that the specification does not provide enablement for the process as generically claimed. Applicants respectfully traverse the rejection.

The Office Action states that the specification does enable a process wherein the molded body is impregnated with an organic substance comprising at least one kind of carbon source. Amended claim 12 is drawn to a process that includes such a step. Thus, as acknowledged in the Office Action, the specification does enable the process as recited in

amended claim 12. Since claims 13-19 depend from claim 12, the specification also enables claims 13-19. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection.

IV. Rejection under §102

The Office Action rejects claim 12 under 35 U.S.C. §102(b) over U.S. Patent No. 5,589,116 to Kojima et al. ("Kojima"). Applicants respectfully traverse the rejection.

The Office Action states that Kojima teaches the claimed process of producing a silicon carbide sintered body. However, Kojima does not teach a process that contains all of the features recited in claim 12. Amended claim 12 is drawn to a method for producing a silicon carbide sintered body, that includes the step of "impregnating the molded body with an organic substance comprising at least one kind of carbon source." The Kojima process fails to contain at least this element as claimed.

As a source of carbon, the Kojima process relies on free carbon present in the original starting silicon carbide powder. The carbon originates in the form of fine carbon particles, uniformly distributed in the silicon carbide matrix of the molded body, and that react with molten silicon to form silicon carbide in the sintering step. Col. 9, lines 13-21. Thus, Kojima does not teach the feature of impregnating the molded body with an organic substance comprising at least one kind of carbon source.

Since Kojima fails to disclose each and every element of the method for producing a silicon carbide sintered body as claimed, Kojima does not anticipate claim 12. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection.

V. Rejection under §103

A. Kriegsmann and Ohno

The Office Action rejects claims 12, 13 and 17-19 under 35 U.S.C. §103(a) over U.S. Patent No. 6,228,283 to Kriegsmann et al. ("Kriegsmann") in view of U.S. Patent No. 4,284,431 to Ohno et al. ("Ohno"). Applicants respectfully traverse the rejection.

Claim 12 recites a method for producing a high-purity silicon carbide sintered body. The compounds utilized in the claimed process include silicon carbide powder in a solvent, an organic substance comprising at least one kind of carbon source, and high purity metal silicon. Kriegsmann and Ohno do not teach or suggest such a method.

Kriegsmann describes a process for producing fiber-reinforced SiC ceramics at lower temperatures (Abstract and col. 2, lines 37- 43). The process includes mixing reinforcing fibers with raw material powder of specified grain size, shaping the material into a green body, and sintering (col. 2, line 56 to col. 3, line 2). In particular, Kriegsmann describes a process for producing fiber-reinforced SiC ceramics under conditions that maintain the stability of the fibers during sintering (col. 3, lines 13-24). The Kriegsmann process controls and adjusts the SiC grain size distribution, along with the sintering temperature, specifically in order to protect the fibers (col. 3, lines 52-54).

Under the described conditions, Kriegsmann produces a sintered body containing embedded mixed fibers (col. 4, lines 52-57). Accordingly, Kriegsmann does not teach or suggest the production of a high-purity silicon carbide sintered body as claimed. Moreover, since the objectives stated in Kriegsmann are different than the objectives disclosed in the present specification, one of ordinary skill in the art would not have been motivated to adopt the teachings of Kriegsmann and to modify the disclosed process of Kriegsmann in order to produce a high-purity silicon carbide sintered body as claimed.

The teachings Ohno do not remedy the deficiencies of Kriegsmann. Ohno describes a method for the production of sintered powder metal preform (Abstract). Ohno fails to teach or suggest any method for producing a high-purity silicon carbide sintered body as claimed. Moreover, the Office Action merely relies on Ohno for describing phenol resins with a carbon content of 10-30%. Regardless of whether or not Ohno teaches such a carbon content, this reference does not teach or suggest anything related to silicon carbide ceramics. Thus,

Ohno and Kriegsmann, alone or in combination, would not have taught, suggested or rendered obvious the method of claim 12 and claims 13 and 17-19 dependent thereon.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection.

B. Kojima and Takahashi

The Office Action rejects claims 12-17 and 19 under 35 U.S.C. §103(a) over U.S. Patent No. 5,589,116 to Kojima et al. ("Kojima") in view of U.S. Patent No. 6,217,969 to Takahashi et al. ("Takahashi"). Applicants respectfully traverse the rejection.

Applicants filed the instant application on August 30, 2001. Thus, since the application was filed after November 29, 1999, this application is examined under the Post-AIPA statute. Thus, under 35 U.S.C. §103(c), subject matter that may qualify as prior art under 35 U.S.C. §102(e) is disqualified as prior art if that subject matter and the claimed invention "were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person."

Takahashi was filed on August 21, 1998 and issued on April 17, 2001. The instant application is a Divisional application of U.S. Patent Application Serial No. 09/610,260 and as such, claims priority to the July 5, 2000 filing date of the parent application. Thus, Takahashi can qualify as a reference only under 35 U.S.C. §102(e). Like the instant application, Takahashi is assigned on its face to Bridgestone Corporation. As a result, Takahashi is disqualified as a reference under 35 U.S.C. §103(c).

In the event that the Takahashi foreign application priority document (JP 9-231572) is cited as a reference under 35 U.S.C. §102(b) and then under §103(a), Applicants traverse the rejection based upon the following remarks.

Kojima describes a process for the preparation of a silicon carbide sintered body that includes the step of shaping a silicon carbide powder, calcining the shaped body in a non-oxidizing atmosphere to form a porous body, and subjecting the porous body to reaction

sintering while being impregnated with molten metallic silicon (Abstract). As detailed in the above remarks, the Kojima process does not rely on a carbon source from an organic substance impregnated in the molded body. As a source of carbon, the Kojima process relies on free carbon present in the starting silicon carbide powder (Col. 9, lines 13-21). Kojima does not teach or suggest, nor does it provide any motivation to include, the feature of impregnating the molded body with an organic substance comprising at least one kind of carbon source.

Takahashi does not remedy the deficiencies of Kojima. The Office Action cites Takahashi only for its alleged teaching of a method of forming silicon carbide powder as recited in claim 14. Regardless of whether Takahashi does or does not teach such a method of forming silicon carbide powder, this reference does not teach or suggest impregnating the molded body with an organic substance comprising at least one kind of carbon source.

Takahashi describes the preparation of molded and sintered material made by mixing together silicon carbide powder and liquid phenol resin in ethanol (Example 1). This material is placed in a mold, hot pressed and sintered under specified temperature, pressure and atmosphere. Nothing in Takahashi teaches or suggests the feature of impregnating the molded body with an organic substance comprising at least one kind of carbon source as claimed.

The combination of Kojima and Takahashi would not have taught or suggested to one of ordinary skill in the art the claimed method for producing a silicon carbide sintered body. Neither reference teaches or suggests a method that includes impregnating the molded body with an organic substance comprising at least one kind of carbon source. For at least this reason, Kojima and Takahashi would not have rendered the method of claim 12 obvious under 35 U.S.C. §103(a). Claims 13-19 depend from claim 12 and thus would also not have been rendered obvious.

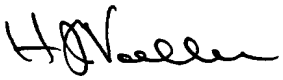
Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection.

VI. Conclusion

In view of the foregoing amendments and remarks, Applicants submit that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 12-19 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number set forth below.

Respectfully submitted,



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APPENDIX

Changes to Specification:

Page 7, lines 6-10:

--A preferable example of solid ~~carbon~~ silicon sources is silicon oxide. The silicon oxide in the reaction sintering process may be silicon monoxide (SiO), may be silica sol (a colloidal ultra-fine silica containing solution, which contains an OH or alkoxyl group therein), or may be silicon dioxide (silica gel, fine silica, quartz powder).--

Page 16, line 22 to page 17, line 5:

--Due to calcinations, the strength of the molded body increases and the stability thereof improves, and therefore, metal silicon heated to be molten is easily introduced into pores within the molded body. Further, carbon generated from the organic substance covers silicon carbide formed on the surface of the pores in the molded body, and therefore, reaction between the carbon and the metal silicon heated to ~~molted~~ molten and impregnated in the pores is carried out easily and homogeneously. Further, a portion of impurities is removed from the molded body and the purity of the molded body also improves.--

Changes to Claims:

The following is a marked-up version of the amended claims:

12. (Amended) A method for producing a silicon carbide sintered body, comprising:

preparing a slurry by dispersing silicon carbide powder in a solvent;

forming a molded body by pouring the slurry into a mold;

impregnating the molded body with an organic substance comprising at least one kind of carbon source; ~~and~~

effecting calcination of the slurry in a vacuum atmosphere or in an inert gas atmosphere; and

sealing pores within the calcined molded body by impregnating the pores with high purity metal silicon molten by heating, and allowing the high purity metal silicon and carbon contained in the molded body to react on each other in the pores so as to produce silicon carbide.

14. (Amended) The method for producing a silicon carbide sintered body according to claim 12, wherein the silicon carbide powder is obtained by a process for preparing silicon carbide powder, which process comprises:

producing silicon carbide powder by homogeneously mixing a silicon source comprising at least one selected from tetraalkoxysilane and polymers of tetraalkoxysilane, each of high purity, and a carbon source comprising an organic compound of high purity which generates carbon upon heating, and heating and firing the mixture in a non-oxidizing atmosphere; and

effecting post-treatment in which ~~heat treatment with~~ the obtained silicon carbide powder ~~being~~ is kept at a temperature from equal to or higher than 1,700°C to lower than 2,000°C and carrying out heat treatment ~~being heated~~ at a temperature between 2,000°C and 2,100°C for 5 to 20 minutes at least once.

18. (Amended) The method for producing a silicon carbide sintered body according to claim 12, wherein ~~a~~ the carbon content of ~~an~~ the organic substance impregnated in the molded body during the calcination is 10 to 30 wt%.